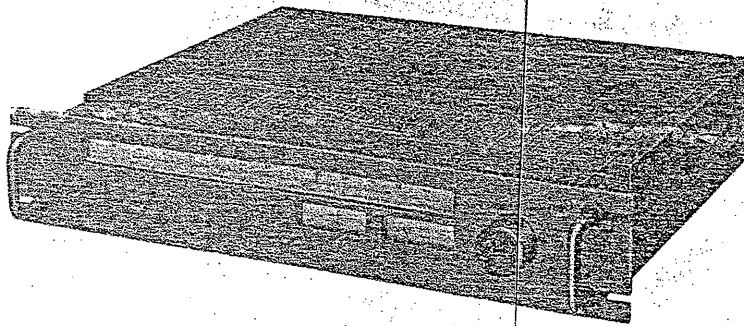


Service Manual

FM Stereo Tuner

ST-9030

(X), (XG), (XGH), (XGF),
(XSD), (XSW), (XE)

The model ST-9030 [X] is available in Asia, Latin America, Middle East and Africa only.
The model ST-9030 [XG] is available in Europe only.
The model ST-9030 [XGH] is available in Holland only.
The model ST-9030 [XGF] is available in France only.
The model ST-9030 [XSD] is available in Scandinavia only.
The model ST-9030 [XSW] is available in Switzerland only.
The model ST-9030 [XE] is available in England only.

TECHNICAL SPECIFICATIONS (IHF)

Specifications are subject to change without notice for further improvement.

FM TUNER SECTION

Frequency range		88 ~ 108MHz
Antenna terminals		75Ω (unbalanced)
Sensitivity		12.8dBf
50 dB quieting sensitivity	MONO	(75Ω) 1.2μV (IHF '58) 18.1 dBf
	STEREO	(75Ω) 2.2μV (IHF '58) 38.1 dBf
Total harmonic distortion	MONO (Wide/Narrow)	(75Ω) 22μV (IHF '58) 0.08%/0.15% (1kHz)
	STEREO (Wide/Narrow)	0.08%/0.3% (1kHz)
S/N	MONO	80 dB
Frequency response	OUTPUT	20Hz ~ 18kHz, +0.1 dB
	REC OUT	20Hz ~ 15kHz, +0.2 dB
Alternate channel selectivity	(Wide/Narrow)	25dB/90dB (400kHz)

Capture ratio	(Wide/Narrow)	0.8 dB/2.0 dB
Image rejection (at 98MHz)		135 dB
IF rejection (at 98MHz)		135 dB
Spurious response rejection (at 98MHz)		135 dB
AM suppression	(Wide)	58 dB
Stereo separation	(Wide)	50 dB at 1kHz, 40 dB at 10kHz
	(Narrow)	40 dB at 1kHz, 30 dB at 10kHz
Leak carrier	OUTPUT	-65 dB (19kHz)
	REC OUT	-70 dB (19kHz, 38kHz)

GENERAL

Output voltage	Fixed (REC OUT)	0.7V
	Variable (OUTPUT)	0 ~ 1.5V
Power supply (50/60Hz)		110/120/220/240V
Power consumption		27W
Dimensions (W x H x D)		450 x 92 x 370mm (17 3/8" x 3 3/8" x 14 3/8")
Weight		7.4 kg (16.3 lb.)

TECHNISCHE DATEN (DIN 45 500)

Spezifikationen können infolge von Verbesserungen ohne Ankündigung geändert werden.

UKW-TUNERTEIL

Frequenzgang		88 ~ 108MHz
Eingangsimpedanz		75Ω (unsymmetrisch)
Eingangsempfindlichkeit		1.2μV beim Rauschverh. v. 30 dB, 75Ω
		1.1μV beim Rauschverh. v. 26 dB, 75Ω
		1.0μV beim Rauschverh. v. 20 dB, 75Ω
Klirrfaktor	MONO (Wide/Narrow)	0.08%/0.15%
	STEREO (Wide/Narrow)	0.08%/0.3%
Rauschabstand	MONO	75 dB
Frequenzgang		20Hz ~ 18 kHz, ±1.5 dB
Selektivität	(Wide/Narrow)	25dB/90 dB (400kHz)
Gleichwellenselektion (Wide/Narrow)		0.8dB/2.0 dB
Spiegelfrequenzunterdrückung 98MHz		135 dB
ZF-Festigkeit bei 98 MHz		135 dB
Unselektivität-Dämpfung bei 98 MHz:		135 dB

AM-Unterdrückung		58 dB
Kanaltrennung	(Wide)	50 dB bei 1kHz, 40 dB bei 10 kHz
	(Narrow)	40 dB bei 1kHz, 30 dB bei 10kHz
Hilfsträgerdämpfung (Pilotton)	OUTPUT	-60dB (19kHz)
	REC OUT	-65dB (19kHz)
Begrenzung, Einsatzpunkt		1.0μV (75Ω)
Bandbreite	ZF-Verstärker (Wide/Narrow)	300kHz/200kHz
	Ratiodetektor (Wide/Narrow)	1.5MHz/1.5MHz
Kanaltrennung		0 dB

ALLGEMEINE DATEN

Ausgangsspannung	Fest (REC OUT)	0.7 V
	Variabel (OUTPUT)	0 ~ 1.5 V
Netzspannung (50/60Hz)		110/120/220/240V
Leistungsaufnahme		27W
Abmessungen (B x H x T)		450 x 92 x 370 mm
Gewicht:		7.4 kg

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

CARACTERISTICS TECHIQUES (IHF) Sujet à changement sans préavis.

PARTIE TUNER FM

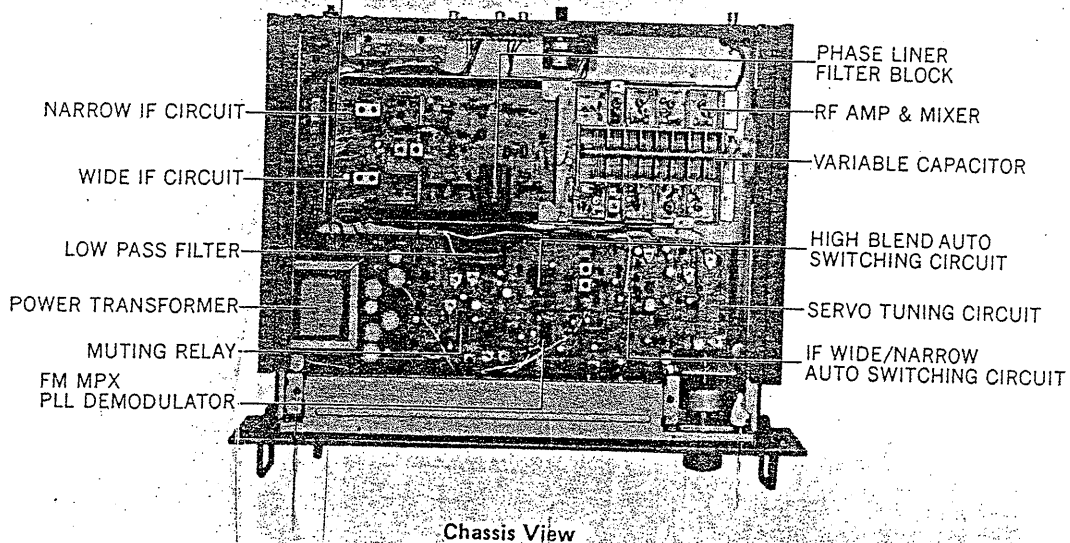
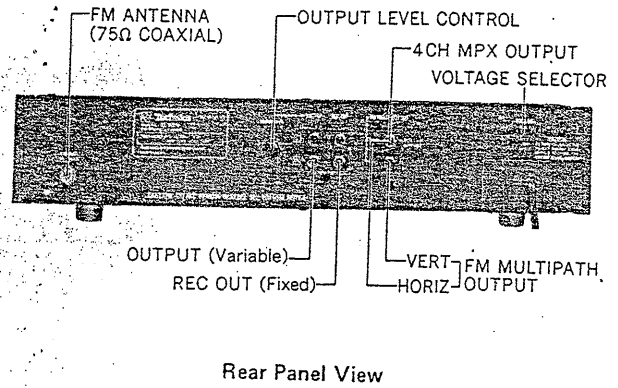
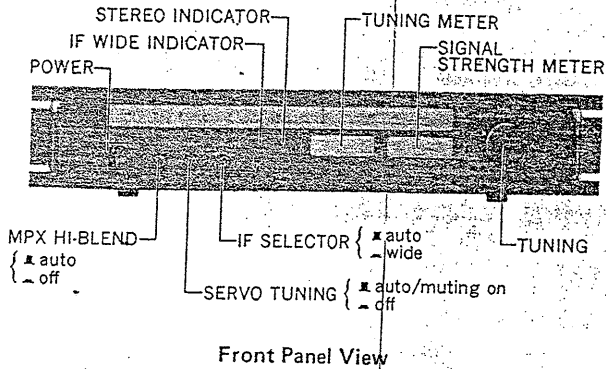
Gamme reçue		88 ~ 108MHz
Bornes d'antenne		75Ω (asymétrique)
Sensibilité		12,8 dBf
Sensibilité pour 50 dB	MONO	75Ω) 1,2μV (IHF '58)
	STEREO	75Ω) 2,2μV (IHF '58)
Distorsion harmonique totale	MONO (wide/narrow)	(75Ω) 22μV (IHF '58)
	STEREO (wide/narrow)	0,08%/0,15% (1kHz)
Rapport S/B	MONO	0,08%/0,3% (1kHz)
		80 dB
Courbe de réponse	OUTPUT	20Hz ~ 18 kHz, +0,1 dB
	REC OUT	20Hz ~ 15kHz, +0,2 dB
Sélectivité en canaux alternés (wide/narrow)		-0,8 dB
		25dB/90dB (400 kHz)

Rapport de capture	(wide/narrow)	0,8dB/2,0dB
Réjection de fréquence image à 98MHz		135 dB
Réjection FI à 98MHz		135 dB
Réjection de réception non sélective à 98MHz		135 dB
Suppression AM (wide)		58 dB
Séparation des canaux	(wide)	1kHz 50 dB, 10kHz 40 dB
	(narrow)	1kHz 40 dB, 10kHz 30 dB
Résidus de porteuse	OUTPUT	-65 dB (19kHz)
	REC OUT	-70dB (19kHz, 38kHz)

GÉNÉRALITÉS

Tension de sortie	Fixed (REC OUT)	0,7V
	Variable (OUTPUT)	0 ~ 1,5V
Alimentation (50/60Hz)		110/120/220/240V
Consommation		27W
Dimensions (L x H x P)		450 x 92 x 370mm
Poids		7,4 kg

LOCATION OF CONTROLS



2 ST-9030

■ TECHNICAL DESCRIPTION

• IF WIDE-NARROW AUTOMATIC CHANGE-OVER CIRCUIT [Fig. 1]

① Functions of TR410, TR414 and TR415 of muting circuit (During tuning)

TR410 is turned "OFF" during tuning, with positive potential appearing at the collector (Refer to the item 4 of the muting circuit operating principle description).

Since the collector of TR410 is connected to the base of TR414, the same positive potential is also applied to the base of TR414. Meanwhile, positive voltage lower than the power source voltage by approximately 0.6V is applied through the silicon diode D407 to the emitter of TR414, and therefore, this transistor of PNP type is turned "OFF", with negative potential appearing at the collector. Thus TR415 is turned "ON" by this negative potential, and the collector of TR415 is rendered to be of ground potential.

(During detuning)

TR410 is turned "ON" during detuning, with the collector rendered to be of ground potential. Thereafter, TR414 is turned "ON", while TR415 is turned "OFF" in the reverse order to that during the tuning. Accordingly, negative potential is developed at the collector of TR415.

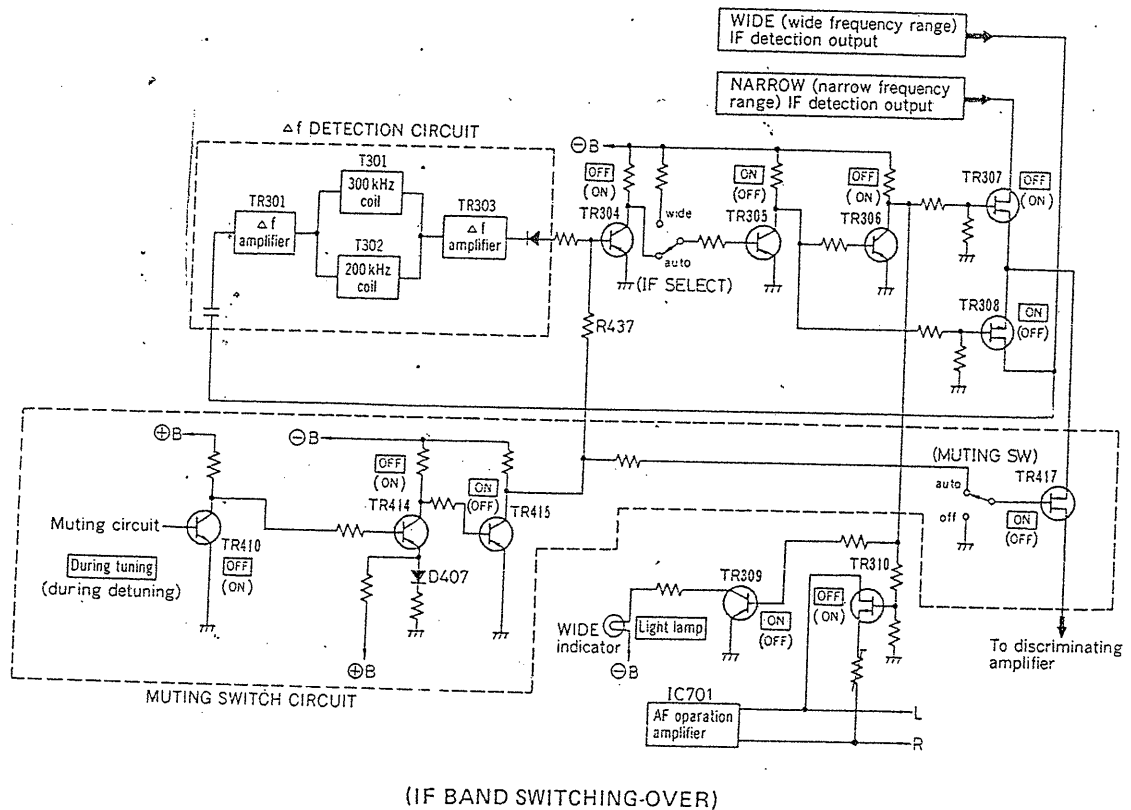


Fig. 1

② WIDE-NARROW switching circuit (During detuning)

Negative potential is developed at the collector of TR415. Since this potential is impressed to TR304 through TR437 to turn "ON" TR304, the collector is reduced to ground potential, thus turning TR305 "OFF". Upon turning "OFF" of TR305, negative potential appears at the collector, with voltage lower than "pitch-off" being applied to the gate of TR308 to "OPEN" the circuit between drain and source. Meanwhile, turning "OFF" of TR305 turns "ON" TR306 to render the collector of TR306 to be of ground potential, with drain and source of TR307 brought into "SHORT" state.

Therefore, during detuning, NARROW IF single is transmitted regardless of presence of interference.

A. In the absence of interference

Since the collector of TR415 is of ground potential, TR304 is in "OFF" state. Moreover, since the Δf component due to interference is not detected, the voltage from the rectifier circuit is also of ground potential, and thus TR304 remains in "OFF" state. Accordingly, when the IF selector switch is in "auto" position, TR305 is turned "ON", while TR308 is brought into "short" state due to the ground potential appearing at the collector, thus WIDE IF signal being transmitted to subsequent circuit. On the other hand, since TR306 is turned "OFF" due to turning "ON" of TR305, negative potential is applied to TR307 to "open" the circuit between drain and source, and thus there being no transmission of NARROW IF signal.

B. Interference component (Δf)

Interference with stations at distances 200 kHz and 300 kHz apart is brought in question in the same receiving area. By utilizing the fact that the wider the IF band width is, the more easily the reception is affected by neighboring stations, this unit detects the interference component (Δf) from WIDE IF circuit.

C. In the presence of interference

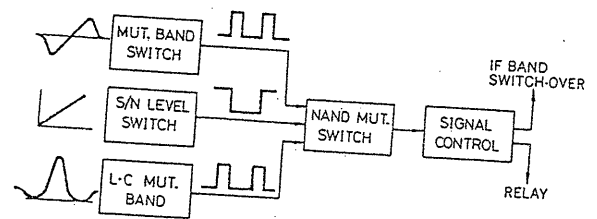
Although TR304 is kept in "OFF" state by TR415 in the absence of interference as explained in the above item A (In the absence of interference), if (Δf) component due to interference is detected, the (Δf) component is amplified by TR301 and TR303. Subsequently, the negative potential obtained through the rectifier circuit is applied to TR304 to turn this TR304 "ON", by which, similar operation to that in detuning is carried out to bring TR307 into "short" state. Therefore, during tuning interference, NARROW IF signal is transmitted to the subsequent circuit.

③ WIDE indicator and separation at "NARROW" time

The collector of TR306 is of ground potential in the presence of interference even during detuning and tuning. This potential is impressed to TR309 and TR310 to bring TR309 into "OFF" state and TR310 into "short" state. Upon turning "OFF" of the TR309, the WIDE indicator connected to its collector is not illuminated. On the other hand, when the TR310 is brought into "short" state, the arrangement in which VR703 is connected to the low frequency circuit is established to render the separation at "NARROW" time optimum. In the absence of interference, during tuning, the collector of TR306 is reduced to negative potential and TR309 is turned "ON", with the WIDE indicator being lit. Meanwhile, TR310 is brought into "Open" state, with the best separation at "WIDE" time being achieved.

• MUTING CIRCUIT

The muting circuit of this unit utilizes 3 circuits as shown in the block diagram of Fig. 2, i.e., the muting band switch circuit making use of S curve of FM detection output, the S/N level switch circuit utilizing IF level output voltage varying according to the input level, and the switch circuit making use of IF band range through L.C. This circuit is capable of readily varying the muting functioning level and muting band width which have conventionally been difficult to be varied by the muting circuit utilizing the L.C. tuning circuit, and is also sufficiently resistant to overmodulated input. The principle of this circuit is described below.



(MUTING SWITCH CIRCUIT)

Fig. 2

① Muting band switch circuit [Fig. 3]

A. Perfectly tuned point and detuned state

In this case, TR406 and TR407 are turned "OFF" since the input voltage is of 0V, with respective emitters being also of 0V.

The potential is applied to the differential amplifier including TR408 and TR409 to turn them "ON". Accordingly, the collector of TR409 is reduced down to the base voltage (0V).

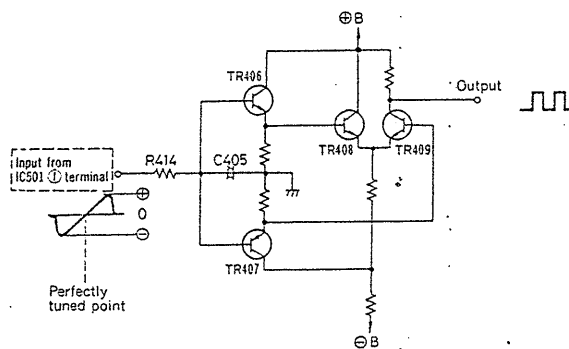
B. In the case of detuning to frequencies higher than the perfectly tuned point

In this case, if the circuit is set to input the positive voltage, the potential acts to charge C405, and when the V_{BE} of TR406 exceeds 0.6V, TR406 is turned "ON". Since TR407 is biased in the reverse direction, it remains in the "OFF" state, with the ground potential being applied to the base of TR409. Upon turning "ON" of TR406, the base potential of TR408 is also raised for further maintaining "ON" state. Accordingly, the emitter potential of TR408 is raised, with the V_{BE} of TR409 reduced below 0.6V, thus TR409 being turned "OFF", and positive voltage appears at the collector of TR409. In other words, the input voltage to cause C405 to be charged up to the voltage for turning TR406 "ON" determines $+\Delta f$ of Fig. 4. Upon exceeding $+\Delta f$, positive voltage appears as the output.

C. In the case of detuning to frequencies lower than the perfectly tuned point

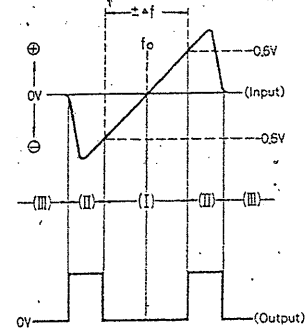
In this case, negative potential is input and this voltage gradually charges C405. When the V_{BE} of TR407 reaches -0.6 V, TR407 is turned "ON", with negative potential appearing at the emitter, and TR409 is brought into "OFF" state, with positive potential being developed at its collector. Meanwhile, TR406 biased in the reverse direction is kept in "OFF" state, and 0V is applied to the base of TR408 to maintain "ON" state. In other words, the input voltage to cause C405 to be charged up to the voltage for turning TR407 "ON" determines $-\Delta f$ of Fig. 4. Upon exceeding $-\Delta f$, positive voltage appears as input.

When summarized, the above description is that the output at the tuned time (I) and detuned time (III) of Fig. 4 is of 0V, and only in the non-tuned time (II), positive voltage is developed at the output. The tuned range $\pm\Delta f$ of (I) is determined by the capacity of C405.



(MUTING BAND SWITCH CIRCUIT)

Fig. 3



(INPUT VOLTAGE AND OUTPUT VOLTAGE)

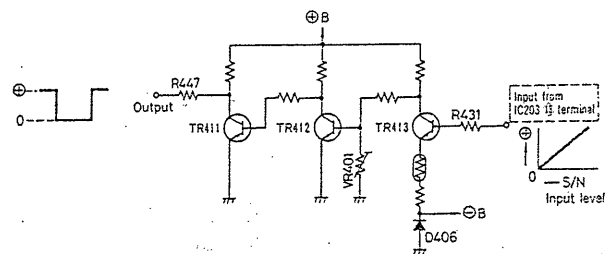
Fig. 4

② S/N level switch circuit

Since the muting band switch circuit functions in the similar manner in the detuned state as in the tuned state, noises are generated in the signal system. As counter-measures against such inconveniences, the muting circuit functioning at band ranges wider than Δf is required. The circuit for such a purpose is shown in Fig. 5. The IF amplifier 13 terminal voltage of IC203 varies in proportion to the FM input signal level. This voltage is applied to TR413 through R431. In the absence of signals, the 13 terminal is of 0V, with the base of TR413 also being of 0V, but the V_{BE} of the emitter of TR413 (-0.6 V) by the presence of D406, and thus TR413 is in "ON" state. Meanwhile, the V_{BE} of TR412 is also set to be 0.6V, with TR412 kept in "ON" state, while TR411 is in "OFF" state, thus positive potential being developed as the output.

As the FM input signal increases, the potential to be applied to TR413 is also raised, with increased collector current, in which case, the collector potential of TR413 is decreased to turn "OFF" TR412. However, VR401 is connected to the base of TR412, and it is so arranged that TR412 is turned "OFF" only by the input voltage of TR413 when S/N of FM input signal exceeds 50 dB. When (muting level adjusting volume) TR412 is turned "OFF", positive potential is applied to TR411 to turn it "ON", with the output being rendered to be of ground potential.

In short, this circuit is one which functions only when the S/N of the FM input signal is over 50 dB, and its output is as shown in Fig. 5.

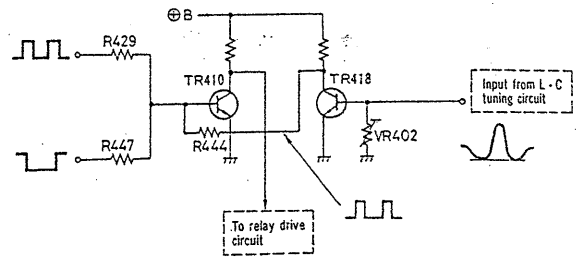


(S/N MUTING LEVEL SWITCH CIRCUIT)

Fig. 5

③ L.C.tuning muting band switch circuit

Although the muting circuit is composed of the muting band switch circuit and S/N level switch circuit, it is so arranged as to apply the narrow band signal from the narrow IF circuit to TR418 of Fig. 6 for providing a more perfect muting circuit, taking malfunction arising from neighboring stations into consideration. When this signal level exceeds 0.6V, TR418 is turned "ON", with the base of TR410 reduced to ground potential, and thus TR410 is turned "OFF".

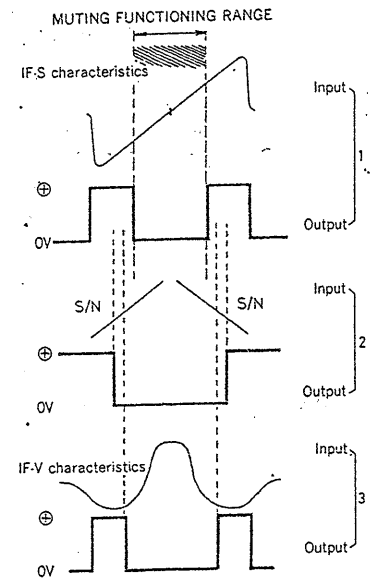


(MUTING NAND CIRCUIT)

Fig. 6

④ Muting NAND circuit

TR410 in Fig. 6 performs NAND switching function. The 3 kinds of signals as explained in the earlier mentioned items 1, 2 and 3 are applied to the base of TR410. The respective signal levels are all rendered to be 0V, and TR410 is turned "OFF" only when these are simultaneously applied to TR410 (hatched portion in Fig. 7). Accordingly, positive potential is developed at the collector, which voltage is transmitted to the relay drive circuit (at the same time, transmitted to the IF band switching circuit from the muting switch circuit) to operate the relay to provide the set output. Should even one of the 3 kinds of the input signals to TR410 is of positive potential, TR410 is turned "ON", with the collector reduced to ground potential, and thus the relay is not operated.



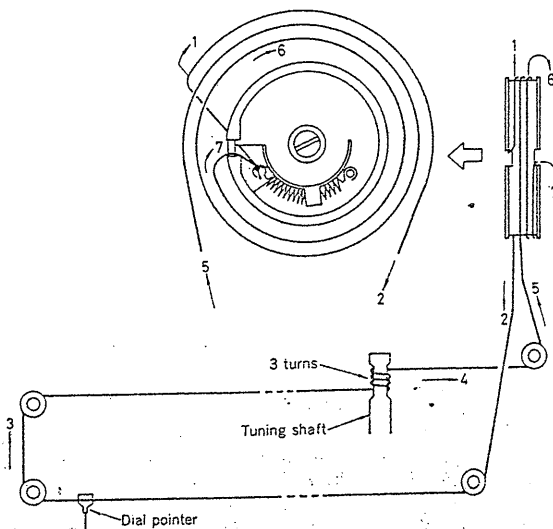
(SIGNAL APPLIED TO NAND CIRCUIT)

Fig. 7

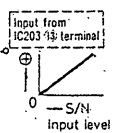
■ DIAL CORD INSTALLATION GUIDE

• For threading a fresh cord, proceed as follows.

1. Prepare a fresh cord more than 180cm (70³/₁₆"') in length.
2. Bring the variable capacitor into a state where the drum is completely turned to the right (maximum capacity and lowest frequency for the variable capacitor).
3. Direct the cord in the order from 1 to 7.
4. Stretch the cord in such a tension as the spring length is elongated by 1.5 times that of the original state.
5. Fix the knot of the cord with the bond.

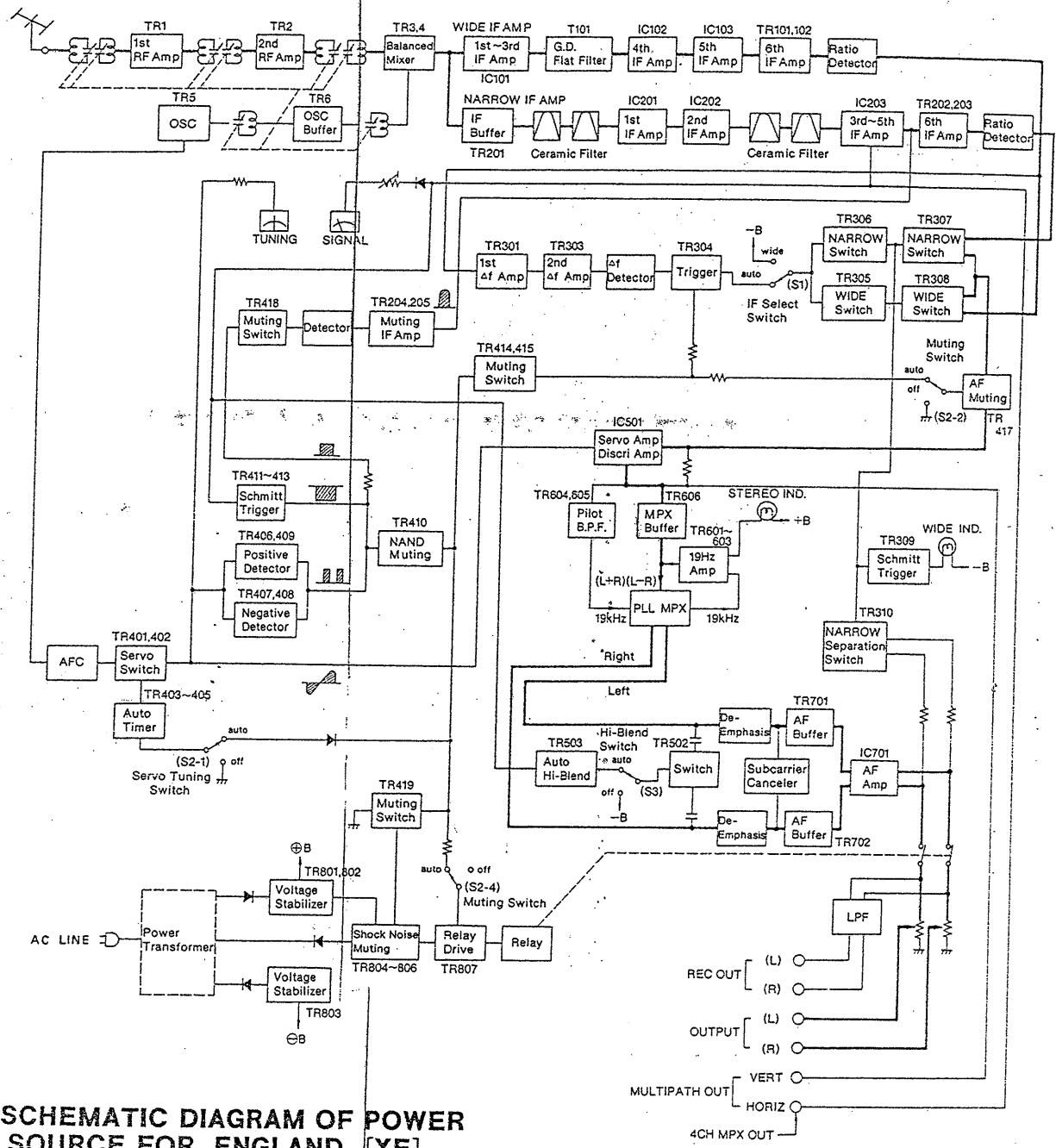


⑥ ST-9030

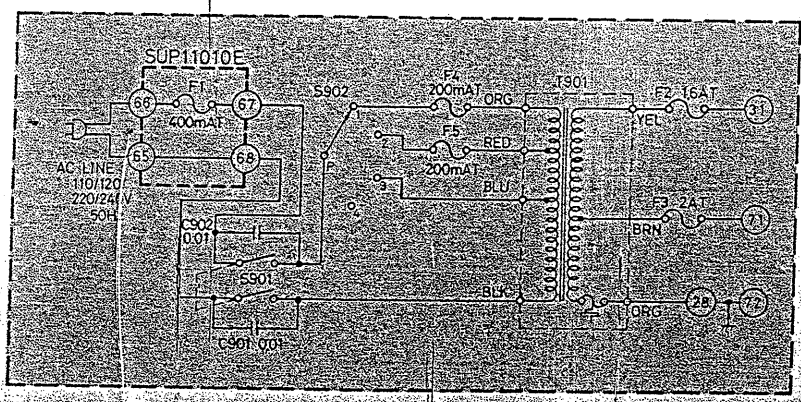


T-9030 ⑤

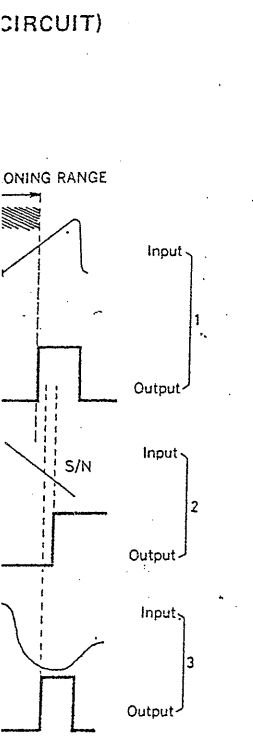
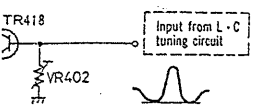
BLOCK DIAGRAM



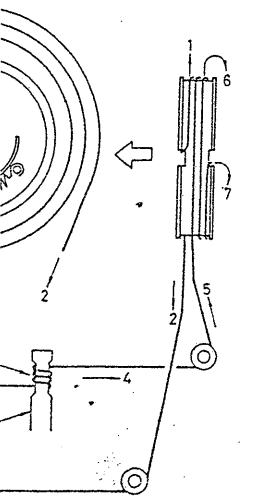
SCHEMATIC DIAGRAM OF POWER SOURCE FOR ENGLAND [XE]

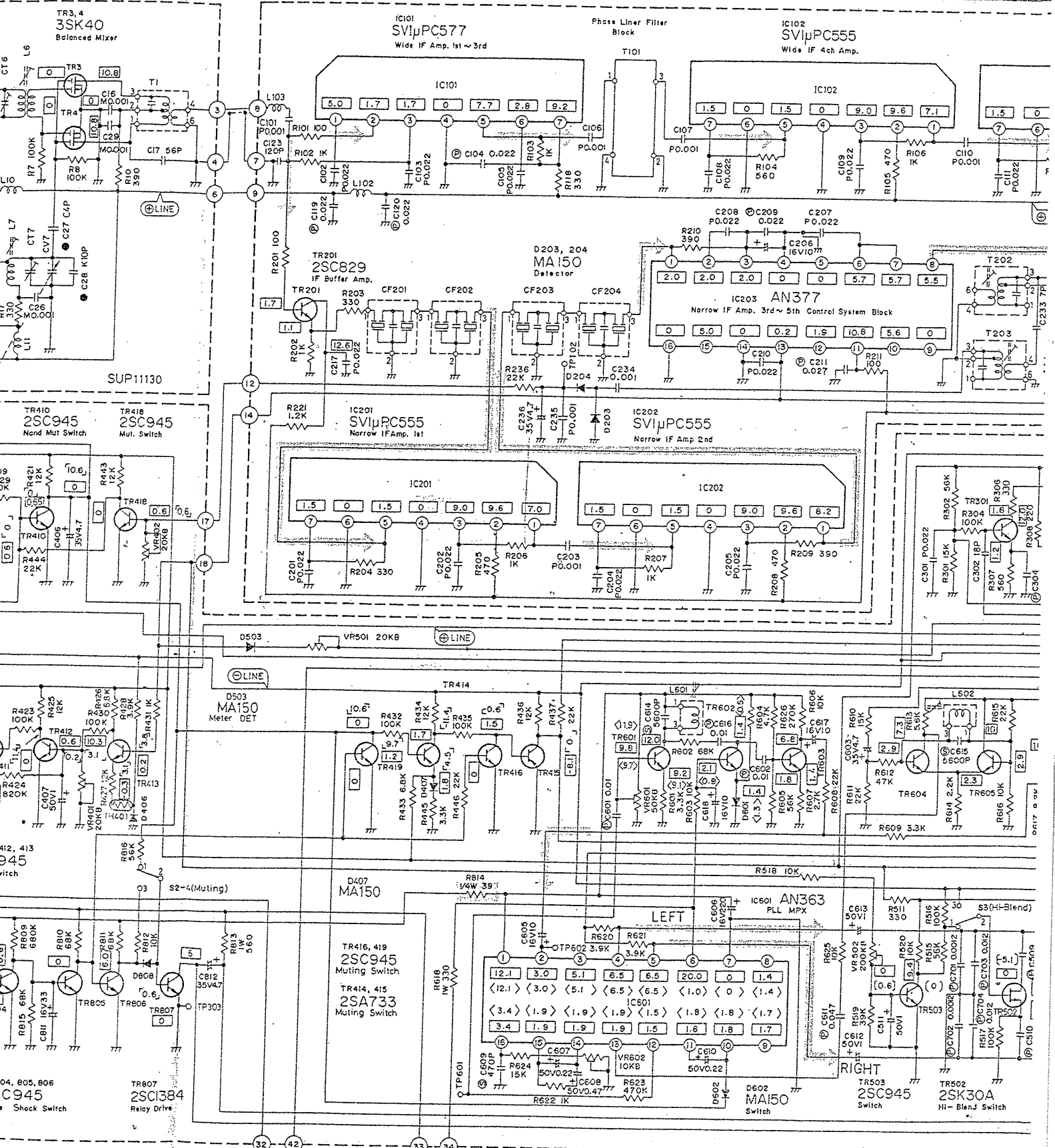


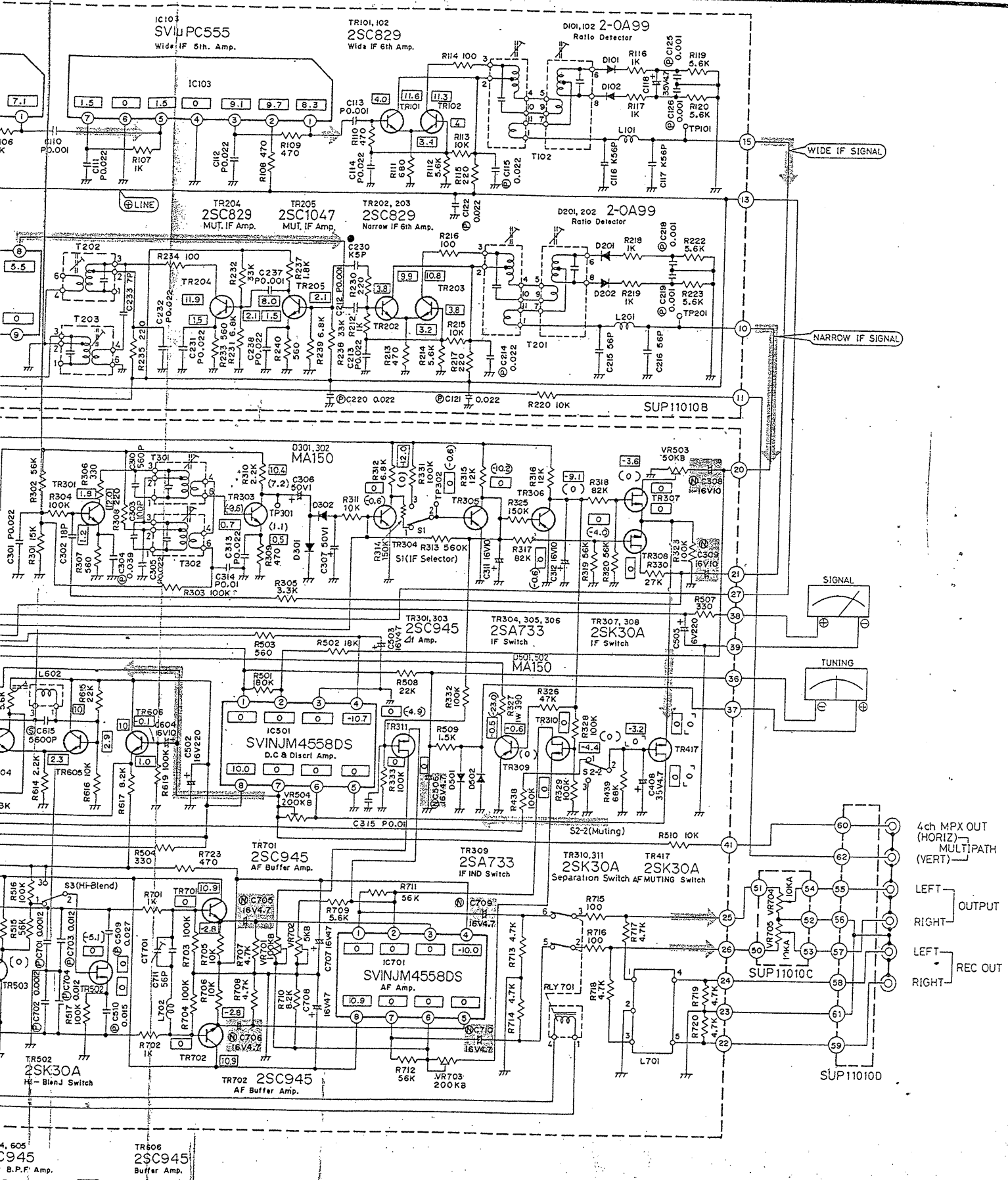
ST-9030 [7]



TO NAND CIRCUIT)
fig. 7







4, 605
 2945
 B.P.F. Amp.
 ST-9030 [12]

TR606
 2SC945
 Buffer Amp.

ST-9030 [13]

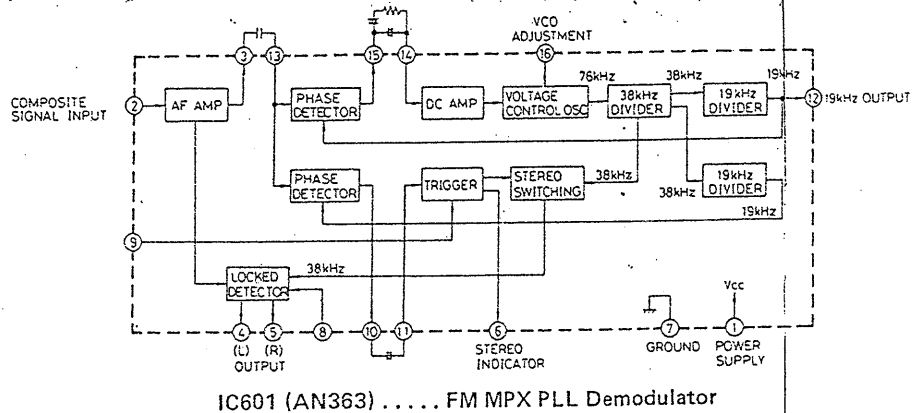
Schematic Diagram ... Model ST-9030

Notes:

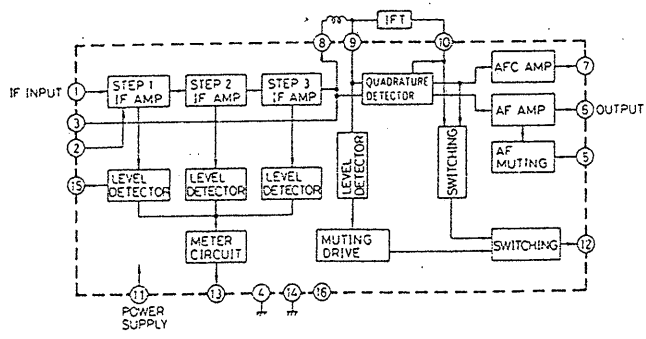
- S1: IF selector switch in "auto" position.
① auto — ③ wide
- S2-1 ~ S2-4: Servo tuning/muting switch in "auto/muting on" position.
① auto/muting on — ③ off
- S3: MPX hi-blend switch in "auto" position.
① auto — ③ off
- S901: Power source switch in "off" position.
- S902: Voltage selector switch in "240V" position.
① 240V — ② 220V — ③ 120V — ④ 110V
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high impedance) with the chassis taken as standard: Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
 - < > are indicated voltage when FM stereo signal reception.
 - [] are indicated voltage when IF narrow position.
 - [] are indicated voltage when muting circuit operation position.
 - [] are indicated voltage when hi-blend circuit operation position.
 - are indicated voltage when FM monaural signal reception or no-signal condition.
- This schematic diagram may be modified at any time with the development of new technology.
- indicates are signal line.

IMPORTANT SAFETY NOTICE
 THE SHADED AREA ON THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR SAFETY. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURER'S SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SHADED AREAS OF THE SCHEMATIC.

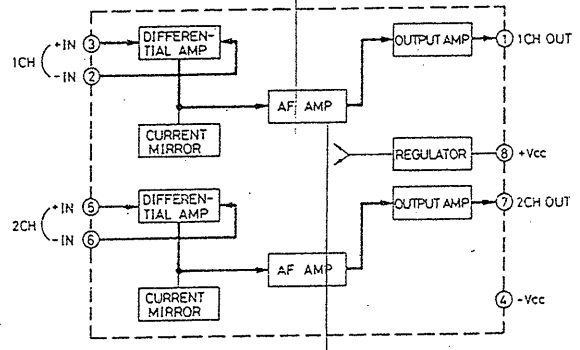
■ BLOCK DIAGRAM OF INTEGRATED CIRCUITS (Standard circuits)



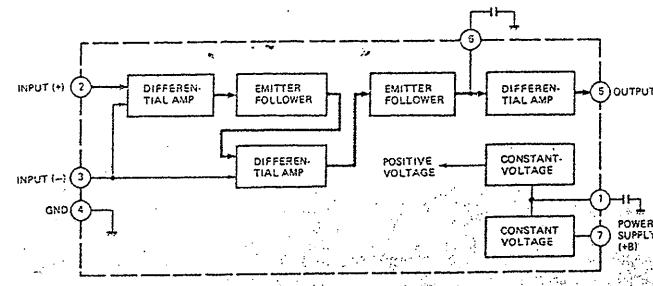
IC601 (AN363) FM MPX PLL Demodulator



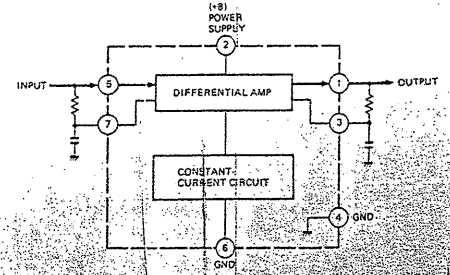
IC203 (AN377) IF Amplifier



IC501, 701 (SVINJM4558DS) 2ch AF Amplifier



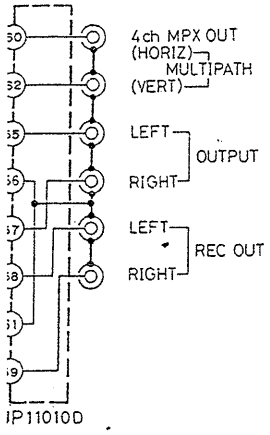
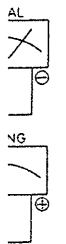
IC101 (SV1μPC577) IF Amplifier



IC102, 103, 201, 202 (SV1μPC555) IF Amp.

SIGNAL

IF SIGNAL



ALIGNMENT INSTRUCTIONS

- Preparation of instruments and appliances to be used.
- 1. AC/DC VTVM
- 2. Oscilloscope
- 3. FM signal generator
- 4. Frequency counter
- 5. Distortion meter
- 6. FM 75Ω dummy antenna (Refer to fig. 1 on page 18)
- 7. Output of signal generator should be no higher than necessary to obtain an output reading.

- Condition of the set
- 1. Mpx hi-blend switch off
- 2. Servo tuning switch off
- 3. IF select switch auto
- 4. Output level control. maximum
- 5. When TP302 and TP303 are short-circuited, the NARROW IF circuit is always established irrespective of the IF switch.

FM SIGNAL GENERATOR		DIAL SETTING	INDICATOR CONNECTION (VTVM, SCOPE and DISTORTION METER)	ADJUSTMENT POINTS	REMARKS	
CONNECTION	FREQUENCY					
IF AND RF ALIGNMENT						
1		No-signal	Point of non-interference	Connect DC VTVM between TP201 and chassis.	T201 (NARROW IFT) [A]	Adjust for 0mV of VTVM indication
2		No-signal	Point of non-interference	Connect DC VTVM between TP101 and chassis.	T102 (WIDE IFT) [A]	
3	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	90MHz (100% Mod. with 400Hz)	90MHz	Connect scope to output terminal.	L8 (OSC Coil) L7 (Buffer Coil) L6 (2nd DET-2) L5 (2nd DET-1) L4 (1st DET-2) L3 (1st DET-1) L2 (ANT-2 Coil) L1 (ANT-1 Coil) T1 (MIX Coil)	<ul style="list-style-type: none"> • Short between TP302 and TP303 • Adjust for maximum output. • Repeat steps (1), (3) and (4).
4	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	106MHz (100% Mod. with 400Hz)	106MHz	Connect scope to output terminal.	CT8 (OSC Trimmer) CT7 (Buffer Trimmer) CT6 (2nd DET-2) CT5 (2nd DET-1) CT4 (1st DET-2) CT3 (1st DET-1) CT2 (ANT-2 Trimmer) CT1 (ANT-1 Trimmer)	
5		No-signal	Point of non-interference	Connect DC VTVM between TP101 and chassis	T102 (WIDE IFT) [A]	Adjust for 0mV of VTVM indication
6		No-signal	Point of non-interference	Connect DC VTVM between TP201 and chassis	T201 (NARROW IFT) [A]	
OUTPUT LEVEL ALIGNMENT						
7	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal	VR504	<ul style="list-style-type: none"> • IF selector switch to "wide" • Tuning at 100MHz. • Adjust VR504 to 1.4V on VTVM indication
MONO DISTORTION ALIGNMENT						
8	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect distortion meter to output terminal	T102 (WIDE IFT) [B]	<ul style="list-style-type: none"> • IF selector switch to "wide" • Tuning at 100MHz • Adjust for minimum distortion
9		100MHz (100% Mod. with 400Hz)	100MHz	Connect distortion meter to output terminal	T201 (NARROW IFT) [B]	<ul style="list-style-type: none"> • IF selector switch to "wide" • Tuning at 100 MHz • Short between TP302 and TP303 • Adjust for minimum distortion. • Repeat steps (8) (9) and (7).
WIDE IF AND NARROW IF OUTPUT LEVEL ALIGNMENT						
10	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal.	VR503	<ul style="list-style-type: none"> • Short between TP302 and TP303. • Tuning at 100 MHz • Adjust VR503 to 1.4V on VTVM indication
MUTING ALIGNMENT						
11	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect DC VTVM between TP102 and chassis.	T202 (MUTING IFT) T203 (MUTING IFT)	<ul style="list-style-type: none"> • Servo tuning switch to "auto" • Tuning at 100 MHz • Adjust for maximum on VTVM
12	Connect signal generator to coaxial antenna terminal through FM dummy antenna.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal.	VR402	In the state where adjustments in them 11 have been completed, fully turn VR402 clockwise, and then turn the same counterclockwise for adjustment to the point where no signal is developed at the output terminal.

	FM SIGNAL
	CONNECTION
13	Connect signal generator to coaxial antenna terminal through dummy antenna. Apply 16dB (6.3) to set.
14	Connect signal generator to coaxial antenna terminal through dummy antenna. Apply 100dB (10) to set.
	<ul style="list-style-type: none"> • Condition at 1. Modulating 2. MODULATING 3. OUTPUT MG 4. PILOT signal 5. MPX OUT...
	CIRCUIT TO BE ADJUSTED
15	Voltage Controlled Oscillator (19kHz Oscillation)
16	Level alignment between L and R
17	Pilot cancel
18	Pilot bandpass filter
19	Subcarrier cancel
20	Wide separation
21	Narrow separation
22	Auto high-blend
23	Auto IF selector

FM SIGNAL GENERATOR		DIAL SETTING	INDICATOR CONNECTION (VTVM, SCOPE and DISTORTION METER)	ADJUSTMENT POINTS	REMARKS
CONNECTION	FREQUENCY				
MUTING LEVEL ALIGNMENT					
13	Connect signal generator to coaxial antenna terminal through FM dummy antenna. Apply 16dB (6.3μV) to set.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM to output terminal.	VR401 • Servo tuning switch to "auto" • Adjust so that output can be obtained.
SIGNAL METER ALIGNMENT					
14	Connect signal generator to coaxial antenna terminal through FM dummy antenna. Apply 100dB (100mV) to set.	100MHz (30% Mod. with 400Hz)	100MHz	Signal meter of set	VR501 Adjust to about "4.7" on signal meter scale.
FM MPX CIRCUIT ALIGNMENT					
<ul style="list-style-type: none"> • Condition at stereo modulator section 1. Modulating frequency... 400Hz 2. MODULATION... 100% 3. OUTPUT MODE... L + R 4. PILOT signal... ON 5. MPX OUT... Preliminarily adjust the frequency of the FM signal generator to 90% modulation, with PILOT set to "OFF", OUTPUT MODE to "L + R" and MOD to "100%." <ul style="list-style-type: none"> • FM signal generator 1. Signal generated... 100MHz 2. Input to the set... 60dB • The set is tuned to 100MHz. 					
CIRCUIT TO BE ADJUSTED	CONNECTING PLACES FOR FM SIGNAL GENERATOR	STEREO MODULATOR	PORTIONS TO BE ADJUSTED	ADJUSTING PROCEDURES	
15	Voltage Controlled Oscillator (19kHz Oscillation)	Connect to antenna terminal of the set through dummy antenna	Non-modulation Monaural signal (Pilot OFF)	VR602 (19 kHz oscillation)	1. Connect the frequency counter to TP601 through 100kΩ. 2. Adjust VR602 to obtain 19kHz ±30Hz
16	Level alignment between L and R	Connect to antenna terminal of the set through dummy antenna	L and R stereo signal (Pilot ON)	VR702 (Level alignment)	1. Connect AC electronic voltmeter to "REC OUT" terminal of the set. 2. Adjust in such a manner that L output at the time of L modulation of the antenna input and R output at the time when input is subjected to R modulation are in the same level.
17	Pilot cancel	Connect to antenna terminal of the set through dummy antenna	Non-modulation Stereo signal (Only pilot ON)	VR601 (pilot cancel) L601 (pilot cancel)	1. Connect oscilloscope or AC electronic voltmeter to TP602. 2. Repeat adjustments of VR601 and L601 to bring the output (19 kHz) to minimum.
18	Pilot bandpass filter	Connect to antenna terminal of the set through dummy antenna	L and R stereo signal	L602 (pilot Bandpass filter)	1. Connect distortion factor gauge to "REC OUT" terminal of the set. 2. Make adjustment so that distortion of L channel output becomes minimum.
19	Subcarrier cancel	Connect to antenna terminal of the set through dummy antenna	Non-modulation Stereo signal	CT701 (Subcarrier cancel)	1. Connect AC electronic voltmeter to "OUTPUT" terminal of the set. 2. Make adjustment to bring the output to minimum.
20	Wide separation	Connect to antenna terminal of the set through dummy antenna	L or R Stereo signal (1 kHz 30% modulation)	VR701 (Wide separation)	1. Connect AC electronic voltmeter to "OUTPUT" terminal of the set. 2. Make adjustments so that, when the antenna input is subjected to L modulation (or R modulation), R channel output (or L channel output) becomes minimum.
21	Narrow separation	Connect to antenna terminal of the set through dummy antenna	L or R Stereo signal (1 kHz 30% modulation)	VR703 (Narrow separation)	1. Short-circuit TP302 and TP303 to form narrow circuit. 2. Adjust VR703 in the similar order as in 20 (wide separation). 3. After completion of adjustments, release TP302 and TP303 from the short-circuited state.
22	Auto high-blend	Connect to antenna terminal of the set through dummy antenna. Adjust the input to the set to 31 dB	L or R Stereo signal (1 kHz 30% modulation)	VR502 (Auto high-blend)	1. Connect AC electronic voltmeter to "OUTPUT" terminal of the set. 2. Before adjustments, keep VR502 fully turned counterclockwise. 3. Measure the output difference (separation) between R channel output and L channel output at the time when antenna input is subjected to L modulation. 4. Measure the output difference between L and R as in the previous item, with high-blend witch set to "auto", and adjust VR502 to obtain the same output difference (separation) as measured in the previous item.
23	Auto IF selector	Connect to antenna terminal of the set through dummy antenna. Adjust the input to the set to 60 dB.	Non-modulation Monaural signal	T301 (300kHz) T302 (200kHz)	1. Apply sine wave of 200kHz to TP101. 2. Connect oscilloscope to TP301, and adjust T302 so that waveform of 200kHz becomes maximum. 3. Subsequently apply sine wave of 300kHz to TP101. 4. Adjust T301 so that the output waveform of TP301 becomes maximum. 5. Repeat adjustments at 200kHz and 300kHz.

IN →
To S.G.
(imp 75Ω)

75Ω
UK
A

ALIGN

• FRONT

BUFI
L

CT7
BUFF
Trimmer

CT8
OSC
Trimmer

L8
OSC
Coil

1
M
C

RKS

itch to "auto"
output can be

4.7"
ale.

ugh 100kΩ.

IT" terminal of
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level.

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" terminal of the
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" terminal of the
um.

" terminal of the
input is subjected
l output (or L

v circuit.
de separation).
2 and TP303

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counterclockwise.
ween R channel
antenna input is

R as in the
to", and adjust
separation) as

02 so that wave-

P101.
TP301 becomes

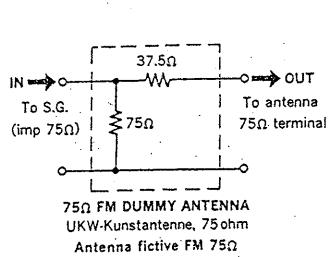
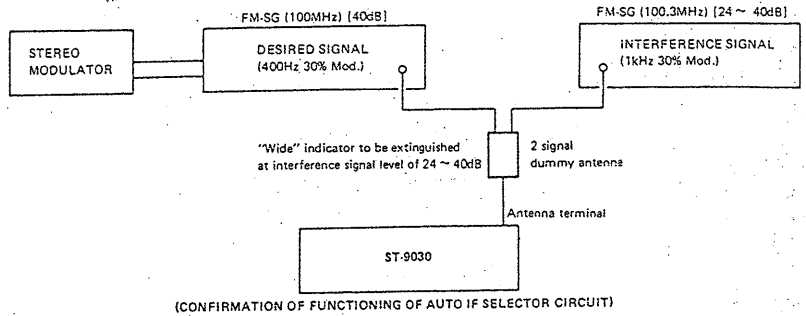


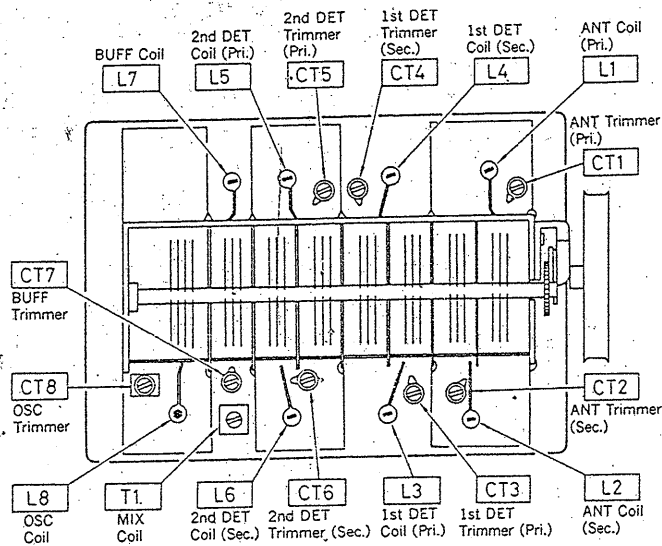
Fig. 1 (Abb. 1)



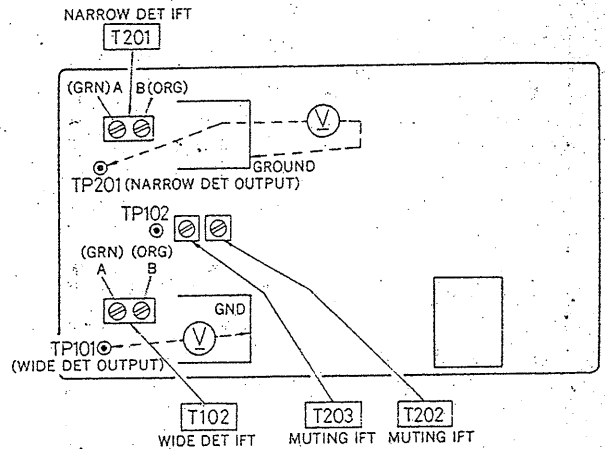
(CONFIRMATION OF FUNCTIONING OF AUTO IF SELECTOR CIRCUIT)

ALIGNMENT POINTS

FRONT END



IF CIRCUIT



MPX CIRCUIT

